stoneconsulting,inc

June 15, 2016

Concord Retirement Board
P.O. Box 535
22 Monument Square
Concord, MA 01742

Dear Concord Retirement Board:

Stone Consulting, Inc. has performed a January 1, 2016 actuarial valuation of the Concord Retirement System. This valuation and report was prepared using generally accepted actuarial principles and practices. This report and valuation results are intended to develop funding contributions for the Retirement System. Results for GASB Statements 67 and 68 and financial accounting will be contained in a separate report. To the best of our knowledge, this report is complete and accurate, and the assumptions used represent our best estimate of anticipated experience of the system.

As part of performing the valuation, Stone Consulting, Inc. was furnished member data by the Concord Retirement System's administrative staff. Although examined for general reasonableness, the data was not audited by the actuary. In addition, the administrative staff furnished financial statements that were not audited by the actuary or by the plan's auditors.

The funding objective of the plan is to fully fund the system while attempting to maintain a stable contribution amount for the upcoming fiscal year that is consistent with prior funding schedules or if employer finances allow it, to increase the contribution amount. This funding objective is being met.

We anticipate over time the contribution level to increase as a percentage of payroll. The contribution rate is determined by adding the normal cost plus an amortization of the unfunded actuarial accrued liability. The normal cost is expected to remain at a level percentage of payroll. The length of the funding schedule contained in this actuarial valuation report is thirteen years (fully funded by 2030). The amortization of the unfunded liability is set to increase by 2.00% annually.

The contribution amount for Fiscal Year 2018 is $5,475,693 which is $170,267 greater than the anticipated contribution amount from the prior funding schedule. PERAC and GASB guidelines indicate that actuarial valuations should be conducted at least every other year. The Concord Retirement Board conducted their previous actuarial valuation effective January 1, 2015.

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Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumptions, increases or decreases expected as part of natural operation of the methodology used for these measurements such as additional contribution requirements based on the plan's funded status, and changes in plan provisions or applicable law. As part of this valuation, we have not performed an analysis of the potential range of future measurements.

We are pleased to present the results of this valuation. If the Retirement Board has any questions on the content of this report, we would be glad to respond. Please note that this report is meant to be used in its entirety. Use of excerpts of this report may result in inaccurate or misleading understanding of the results.

I, Lawrence Stone, am a consultant for Stone Consulting, Inc. I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,
STONE CONSULTING, INC.
Actuaries for the Plan

Lawrence B. Stone
Member, American Academy of Actuaries

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Introduction

This report presents the results of the actuarial valuation of the Concord Retirement System. The valuation was performed at the request of the Retirement Board as of January 1, 2016 for the purpose of determining the contribution requirements for Fiscal Year 2018 and beyond. The contribution requirements are based on:

- The financial condition of the system as of December 31, 2015
- The benefit provisions of M.G.L. Chapter 32 and related statutes;
- The demographics of members in the system (i.e., active and inactive participants, retirees and beneficiaries as of January 1, 2016);
- Economic assumptions regarding salary increases and investment earnings; and
- Other actuarial assumptions (e.g., withdrawals, retirement, death, etc.)

January 1, 2016 Valuation Summary

	Valuation as of January 1, 2016	Valuation as of January 1, 2015	Change
Contribution Fiscal 2018	$5,475,693	$5,305,425	$170,267 increase
Funding Schedule Length (as of Fiscal 2018)*	13 years	13 years	Same
Amortization Increase*	2.00%	2.00%	Same
Funding Ratio	83%	81%	2%
Interest Rate Assumption	7.00%	7.25%	-0.25%
Salary Increase Rate Assumption	Select and Ultimate 4.00% ultimate rate; 3.25% base rate while receiving the steps below:	Same	Same

Step	1	2	3	4	5	6 - 10
Grp 1&2	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Fire	4.7%	4.7%	4.7%			
Police	5.2%	5.6%	7.3%	5.0%	4.8%	

* Previous schedule based on 1/1/2015 valuation

- The Fiscal Year 2018 contribution is $170,267 greater than the planned 2018 contribution. Stone Consulting, with agreement from the Retirement Board, values assets using a four-year asset smoothing method. In this approach, asset gains and losses are recognized over a four-year period. The first 25% is recognized immediately. The purpose of this approach is to avoid wide swings in asset value from one year to the next. See page 14 for detailed information.

- The System, over the one-year period from January 1 to December 31, 2015, experienced a 0.3% annual return on the market value of assets versus our 2015 assumption of 7.25%. There was a $9,213,689 net actuarial asset loss in calendar year 2015. The System's asset portfolio, effective December 31, 2015 is approximately 71% equities and 29% fixed income and short-term investments. The interest rate assumption was reduced to 7.00% to reflect anticipated future market performance. This change increased the actuarial accrued liability by $4.4 million, and increased the Net Normal Cost by $241 thousand (a change of 14.6%).

- The investment return assumption is a long-term assumption and is based on capital market expectations by asset class, historical returns, and professional judgment.

- The salary increase assumption is based on a select and ultimate table, with a 4.00% ultimate rate. Group 1 and 2 employees are assumed to receive 10 years of 3.0% steps; Fire employees are assumed to receive 3 years of 4.7% steps; Police are assumed to receive step increases of 5.2%, 5.6%, 7.3%, 5.0%, and 4.8% for their first 5 years of service. For employees who are assumed to be receiving steps, we have assumed a base increase rate of 3.25%. The salary assumption has been maintained from the prior valuation. Total compensation changed by 2.2% over the prior valuation; however average annual compensation (compensation divided by number of active members) only changed by 1.1%. The salary increase assumption reflects prior experience, current contracts, current expectations, and professional judgment.

- The funding level of the Concord Retirement System is 83% (80% using market value of assets instead of actuarial value of assets) compared to 81% for the January 1, 2015 actuarial valuation. The funding level is estimated to be in the top quartile for Massachusetts' Contributory Retirement Systems.

The schedule length is thirteen (13) years, a length consistent with the 14 years remaining from the 14 year schedule from the January 1, 2015 valuation. This satisfies the maximum limit of FY2030 set by Section 22D of Chapter 32 of the Massachusetts General Laws. Additionally there is a different maximum period permitted under Section 22F of Chapter 32 of the Massachusetts General Laws which is twenty-three years (Fiscal 2040). This maximum limit imposes additional conditions on a retirement system's contribution requirements. The amortization of the unfunded liability increases by 2.00% each year.

- Non-economic assumptions were maintained from the January 1, 2015 actuarial valuation. The mortality assumption is based upon the RP-2000 table projected from 2000 with Generational Mortality and Scale BB.

January 1, 2016 Actuarial Valuation Results

	January 1, 2016	January 1, 2015	Percentage Change
Funding			
Contribution for Fiscal 2018	$5,475,693		3.2%
Contribution for Fiscal 2018 based on current schedule		$5,305,425	
Members			
▪ Actives			
a. Number	519	513	1.2%
b. Annual Compensation	$29,941,179	$29,283,408	2.2%
c. Average Annual Compensation	$57,690	$57,083	1.1%
d. Average Attained Age	49.4	49.6	-0.4%
e. Average Past Service	12.0	12.2	-1.6%
▪ Retired, Disabled and Beneficiaries			
a. Number	279	274	1.8%
b. Total Benefits*	$6,856,829	$6,463,837	6.1%
c. Average Benefits*	$24,576	$23,591	4.2%
d. Average Age	73.2	73.7	-0.6%
▪ Inactives			
a. Number	139	120	15.8%
Normal Cost			
a. Total Normal Cost as of January 1, 2016	$4,625,336	$4,331,620	6.8%
b. Less Expected Members' Contributions	2,726,688	2,654,694	2.7%
c. Normal Cost to be funded by the Municipality	$1,898,648	$1,676,926	13.2%
d. Adjustment to July 1, 2017	122,316	108,032	13.2%
e. Administrative Expense Assumption	285,141	274,981	3.7%
f. Normal Cost Adjusted to July 1, 2017	$2,306,105	$2,059,939	12.0%
Actuarial Accrued Liability as of January 1, 2016			
a. Active Members	$93,599,121	$89,439,219	4.7%
b. Inactive Members	1,694,591	1,695,429	0.0%
c. Retired Members and Beneficiaries	71,717,781	65,417,483	9.6%
d. Total	$167,011,493	$156,552,131	6.7%
Unfunded Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of January 1, 2016	$167,011,493	$156,552,131	6.7%
b. Less Actuarial Value of Assets as of January 1, 2016	137,855,240	126,816,839	8.7%
c. Unfunded Actuarial Accrued Liability as of January 1, 2016	$29,156,253	$29,735,292	-1.9%
d. Adjustment to July 1, 2017	$1,015,211	$1,455,833	
e. Unfunded Actuarial Accrued Liability as of July 1, 2017	$30,171,464	$31,191,125	

*Excluding State reimbursed COLA

Demographic Information

	January 1,2016	Percentage Change
Members		
▪ Actives		
a. Number	519	1.2%
b. Annual Compensation	$29,941,179	2.2%
c. Average Annual Compensation	$57,690	1.1%
d. Average Attained Age	49.4	-0.4%
e. Average Past Service	12.0	-1.6%
▪ Retired, Disabled and Beneficiaries		
a. Number	279	1.8%
b. Total Annual Retirement Allowance excluding State-reimbursed COLA	$6,856,829	6.1%
▪ Inactives		
a. Number	139	15.8%

- The data was supplied by the Concord Retirement Board. The data was checked under broad parameters for reasonableness. With the assistance of the staff of the Concord Retirement Board, we were able to develop a database sufficient for valuation purposes.

History of Active Participants

Valuation Year	Number	Average Age	Average Past Service	Average Ann'l Compensation
2016	519	49.4	12.0	$57,690
2015	513	49.6	12.2	$57,083
2014	502	49.5	12.3	$54,809
2012	493	49.3	12.0	$51,159
2010	488	48.7	11.7	$49,378
2008	461	48.2	11.3	$46,193
2006	451	47.8	11.1	$41,963
2004	438	47.1	10.5	$41,086
2002	444	46.2	10.0	$37,784
2000	434	45.6	9.7	$34,119

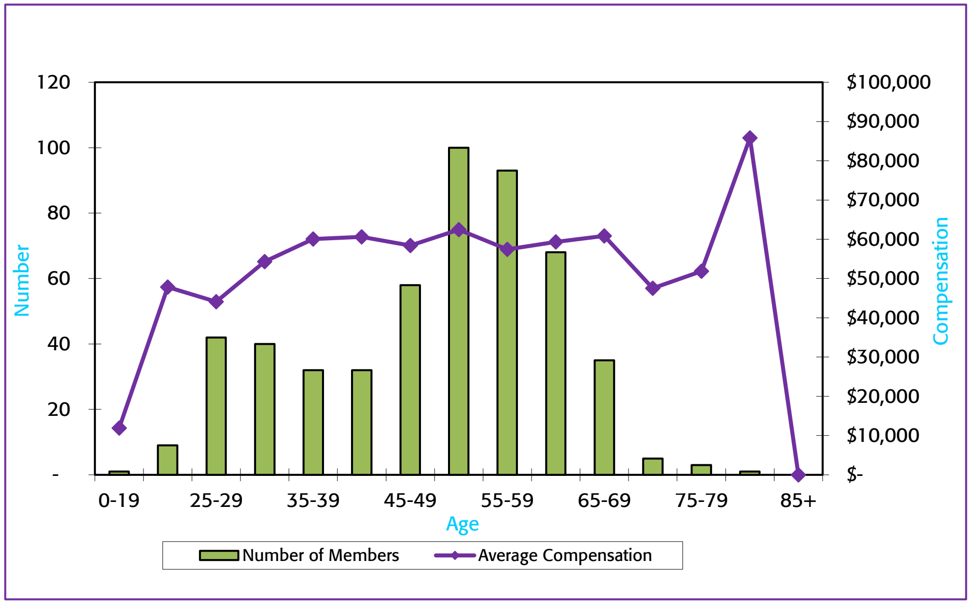
- Employee age has increased by 3.8 years and service has increased by 2.3 years over the course of the past sixteen years. This is consistent with the trend in the Commonwealth towards an aging of the employee population. Average annual compensation has grown by 69.1% (3.3% annually) over the same time period. Note that for the first time since at least the 2000 valuation, there is a decrease in the average age and the average past service.

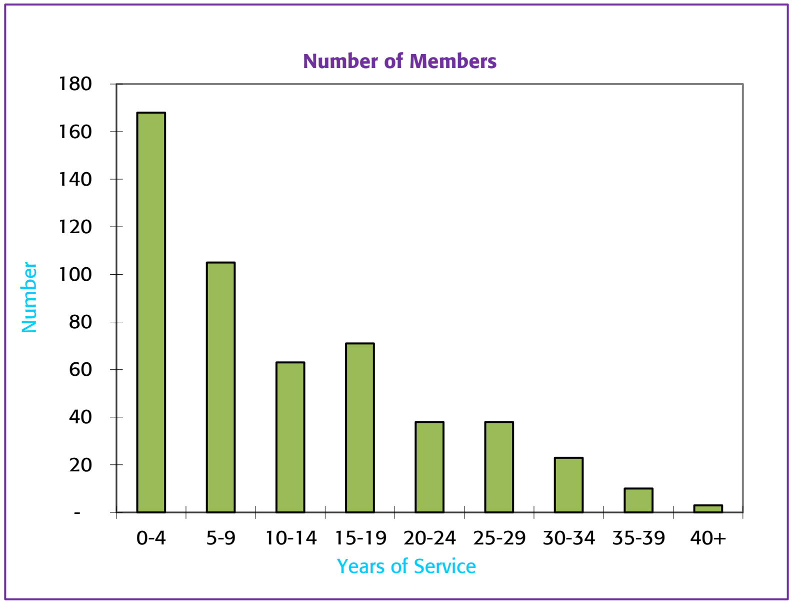
The charts on the following pages summarize demographic information regarding active and retiree members.

Distribution of Plan Members as of January 1, 2016

ACTIVE MEMBERS

AGE	0-4 Years	5-9 Years	10-14 Years	15-19 Years	20-24 Years	25-29 Years	30-34 Years	35-39 Years	40 + Years	Total	Total Compensation	Average Compensation
0-19	1	-	-	-	-	-	-	-	-	1	$ 11,887	$ 11,887
20-24	9	-	-	-	-	-	-	-	-	9	$ 430,552	$ 47,839
25-29	40	2	-	-	-	-	-	-	-	42	$ 1,851,855	$ 44,092
30-34	23	16	1	-	-	-	-	-	-	40	$ 2,172,860	$ 54,322
35-39	9	10	8	5	-	-	-	-	-	32	$ 1,922,657	$ 60,083
40-44	13	5	7	6	1	-	-	-	-	32	$ 1,940,237	$ 60,632
45-49	22	8	3	12	7	5	1	-	-	58	$ 3,387,106	$ 58,398
50-54	24	21	10	16	9	11	9	-	-	100	$ 6,242,048	$ 62,420
55-59	10	25	19	13	6	9	7	4	-	93	$ 5,339,296	$ 57,412
60-64	14	9	7	10	9	10	5	4	-	68	$ 4,034,445	$ 59,330
65-69	3	8	6	4	6	3	1	2	2	35	$ 2,129,309	$ 60,837
70-74	-	1	1	2	-	-	-	-	1	5	$ 237,461	$ 47,492
75-79	-	-	1	2	-	-	-	-	-	3	$ 155,642	$ 51,881
80-84	-	-	-	1	-	-	-	-	-	1	$ 85,825	$ 85,825
85+	-	-	-	-	-	-	-	-	-	-	$ -	$ -
TOTAL	**168**	**105**	**63**	**71**	**38**	**38**	**23**	**10**	**3**	**519**	**$ 29,941,179**	**$ 57,690**





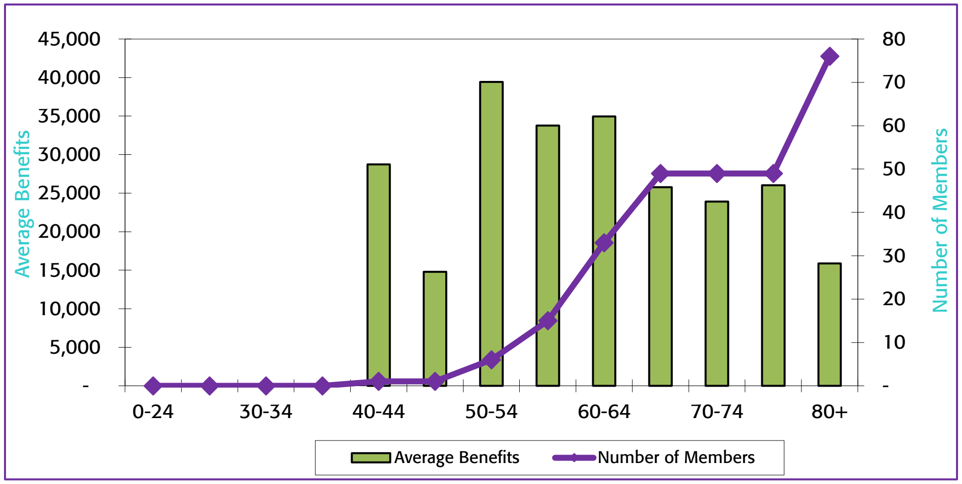
Distribution of Plan Members as of January 1, 2016

RETIRED MEMBERS

Retired Members and Beneficiaries			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	-	-	-
45-49	1	14,792	14,792
50-54	5	38,776	193,881
55-59	11	39,617	435,782
60-64	27	35,867	968,403
65-69	46	25,117	1,155,360
70-74	47	23,699	1,113,848
75-79	46	26,222	1,206,206
80+	75	15,767	1,182,500
TOTAL	258	$ 24,305	$ 6,270,772

Disabled Members			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	1	28,719	28,719
45-49	-	-	-
50-54	1	42,768	42,768
55-59	4	17,654	70,615
60-64	6	30,850	185,101
65-69	3	35,793	107,378
70-74	2	28,770	57,540
75-79	3	23,162	69,485
80+	1	24,452	24,452
TOTAL	21	$ 27,907	$ 586,057

Total			
Age	Number	Average Benefit	Total Benefit
0-24	-	-	-
25-29	-	-	-
30-34	-	-	-
35-39	-	-	-
40-44	1	28,719	28,719
45-49	1	14,792	14,792
50-54	6	39,441	236,649
55-59	15	33,760	506,396
60-64	33	34,955	1,153,505
65-69	49	25,770	1,262,738
70-74	49	23,906	1,171,388
75-79	49	26,035	1,275,691
80+	76	15,881	1,206,952
TOTAL	279	$ 24,576	$ 6,856,829



Benefits shown are net of State reimbursed COLA.

Valuation Methodology

Stone Consulting, Inc. used the Entry Age Normal actuarial funding method in this actuarial valuation. The use of the Entry Age Normal actuarial funding method is consistent with the requirements of Chapter 32 of the Massachusetts General Laws.

NORMAL COST

	January 1, 2016	% of Payroll*
Gross Normal Cost (GNC)	$4,625,336	15.4%
Employees Contribution	$2,726,688	9.1%
Net Normal Cost (NNC)	$1,898,648	6.3%
Adjusted to Beginning of Fiscal Year 2018	$122,316	
Administrative Expense	$285,141	1.0%
Adjusted Net Normal Cost With Admin. Expense	$2,306,105	

*Payroll paid in 2015 for employees as of January 1, 2016 is $29,941,179. Payroll for new hires in 2015 was annualized.

- The gross normal cost (GNC) is the "price" of benefits accruing in the current year if the assumptions underlying the normal cost were realized.

- An individual normal cost represents that part of the cost of a member's future benefits that are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability, and withdrawals) are included in this calculation.

- Anticipated employee contributions to be made during the year are subtracted from the GNC to determine employer normal cost, or net normal cost (NNC).

- Administrative expenses added to the NNC. The administrative expense does not include investment manager and custodial fees. These fees are considered part of the interest rate assumption that is net of fees.

Actuarial Accrued Liability and Funded Status

				January 1, 2016	Percentage Change
Active Actuarial Accrued Liability			$	93,599,121	4.7%
Superannuation	$	87,230,854			
Death	$	1,854,616			
Disability	$	3,614,957			
Withdrawal	$	898,694			
Retiree, Inactive, Survivor and Beneficiary Actuarial Accrued Liability			$	73,412,372	9.4%
Retirees and Beneficiaries	$	64,482,016			
Disabled	$	7,235,765			
Inactive	$	1,694,591			
Total Actuarial Accrued Liability (AAL)			$	167,011,493	6.7%
Actuarial Value of Assets (AVA)			$	137,855,240	8.7%
Unfunded Actuarial Accrued Liability			$	29,156,253	Concord
Funded Ratio (AVA / AAL)					
2016 (7.00% interest rate):		83%			
2015 (7.25% interest rate):		81%			

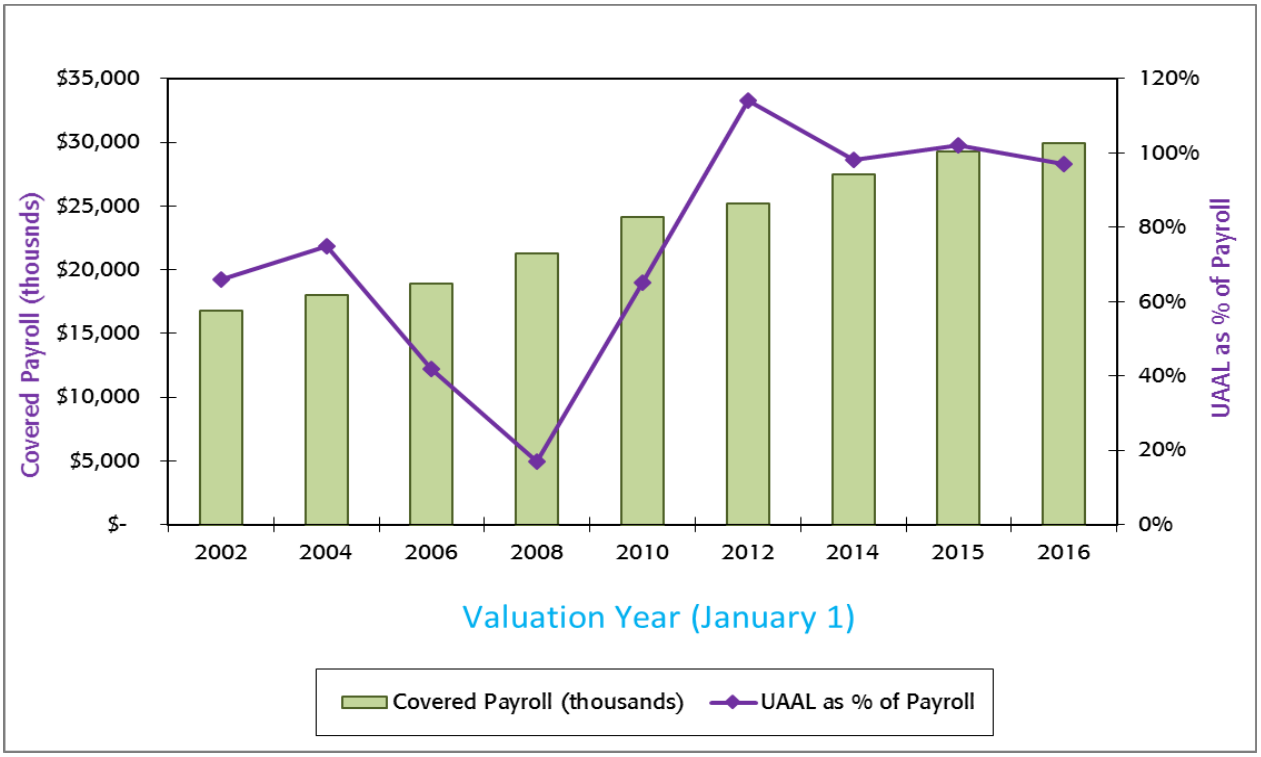
- Actuarial Accrued Liability (AAL) is the "price" of benefits attributable to benefits earned in past years, or in other words, represents today's value of all benefits earned by active and inactive members.

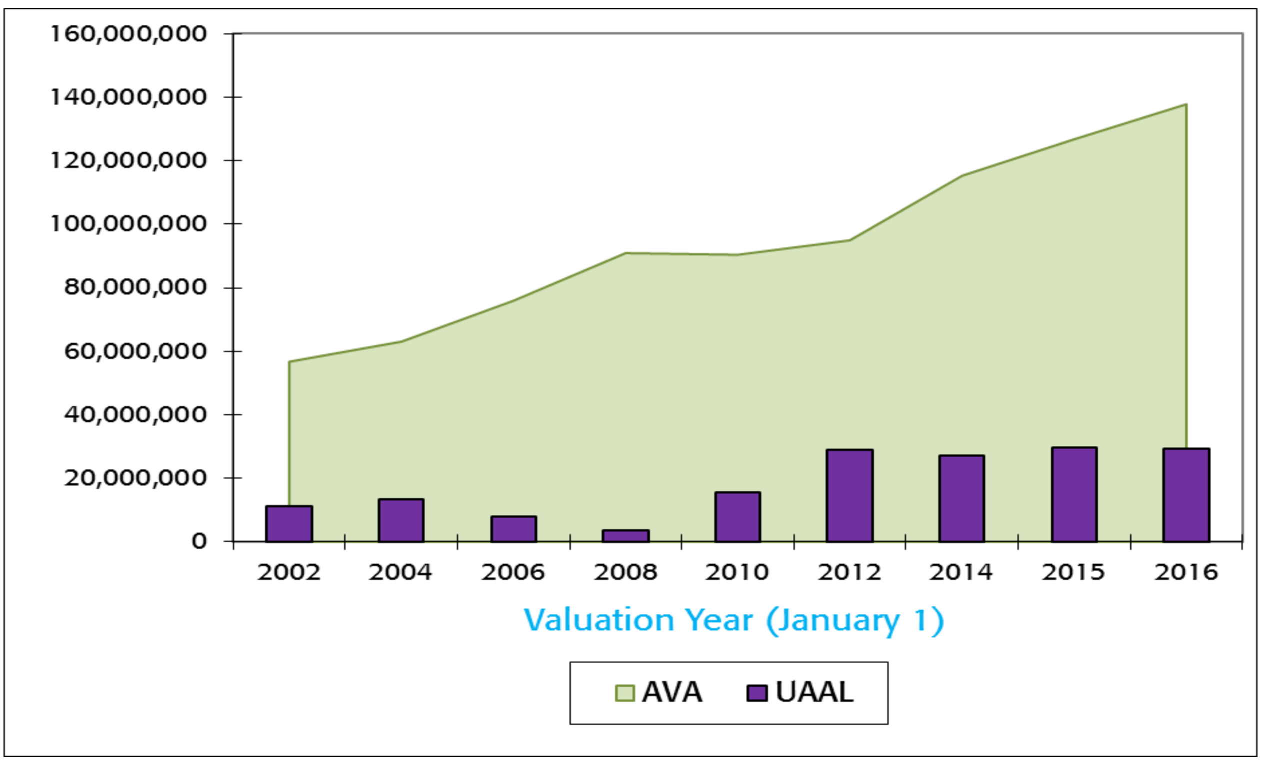
The total AAL is $167,011,493. This along with an actuarial value of assets of $137,855,240 produces a funded status of 83%. This compares to a funded status of 81% for the 2015 valuation.

The UAAL and funded ratio are measures of the plan's funded status. These measures reflect the plan's position as of January 1, 2016. We believe these measures, by themselves, are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions. However, we believe these measures, in conjunction with the plan's funding schedule, are appropriate for assessing the amount of future contributions.

The charts on the following page contain a history of the unfunded actuarial accrued liability (UAAL) and the valuation assets (AVA) over the course of the past nine actuarial valuations, and a history of the unfunded liability as compared to the covered payroll.

Charts of Selected Actuarial and Demographic Statistics





Development of Funding Schedule

Net Employer Normal Cost for Fiscal 2018 (including admin. expenses)	$ 2,306,105
Net 3(8)(c) Payments	125,797
Amortization	3,043,791
Total Appropriation required for Fiscal 2018	$ 5,475,693

- The funding schedule is composed of the normal cost, the net 3(8)(c) payments and the amortization of the actuarial accrued unfunded liability and is adjusted by the administrative expense assumption. The contribution is assumed to be made at the beginning of the fiscal year. The 3(8)(c) payments are the amount that the Concord Retirement System pays to or receives from other retirement boards for service that a retiree had with a different retirement system. The net 3(8)(c) payments is the difference between what the Concord Retirement System paid out minus what was received by the System.

- The contribution amount for Fiscal 2018 is $5,475,693. The funding schedule is presented on the following page. The schedule's length is thirteen (13) years (for the fresh start base) which is equal to the remainder of the 14 year schedule from the January 1, 2015 valuation. This satisfies the maximum schedule length requirement of Section 22D of Chapter 32 of the Massachusetts General Laws (MGL). Additionally there is a longer maximum period permitted under Section 22F of Chapter 32 of the MGL which is twenty-three years (Fiscal 2040). The Section 22F maximum limit imposes additional requirements on a retirement system's contribution requirements such as prohibition of reductions in contributions from year to year.

- In developing the funding schedule, we used a fresh start approach in which the unfunded actuarial accrued liability (UAAL), other than the UAAL due to past early retirement incentives, is reamortized instead of maintaining the existing amortization amount and separately amortizing the actuarial gain or loss. The use of a fresh-start approach can result in a funding schedule in which the changes in contribution amounts from year to year are more consistent. The amortization increases each year at a rate of 2.00%.

FUNDING SCHEDULE

Fiscal Year	Normal Cost	Unfunded Liability	Funding Amortization of UAAL	Net 3(8)(c) Payments	Schedule Contribution
2018	2,306,105	30,171,464	3,043,791	125,797	5,475,693
2019	2,404,114	29,026,610	3,104,666	125,797	5,634,578
2020	2,506,289	27,736,480	3,166,760	125,797	5,798,846
2021	2,612,807	26,289,601	3,230,095	125,797	5,968,699
2022	2,723,851	24,673,671	3,294,697	125,797	6,144,345
2023	2,839,615	22,875,503	3,360,591	125,797	6,326,002
2024	2,960,298	20,880,956	3,427,803	125,797	6,513,898
2025	3,086,111	18,674,874	3,496,359	125,797	6,708,267
2026	3,217,271	16,241,011	3,566,286	125,797	6,909,353
2027	3,354,005	13,561,956	3,637,612	125,797	7,117,413
2028	3,496,550	10,619,049	3,710,364	125,797	7,332,711
2029	3,645,153	7,392,293	3,784,571	125,797	7,555,521
2030	3,800,072	3,860,262	3,860,262	125,797	7,786,132
2031	3,961,575	-	-	125,797	4,087,372

Amortization of Unfunded Liability as of July 1, 2017

Year	Type	Original Amort. Amount	Percentage Increasing	Original # of Years	Current Amort. Amount	Years Remaining
2018	Fresh Start	3,043,791	2.00%	13	3,043,791	13

Notes on Amortization of Unfunded Liability

Year is the year the amortization base was established. **Type** is the reason for the creation of the base. **Original Amortization Amount** is the annual amortization amount when the base was established. **Percentage Increasing** is the percentage that the Original Amortization Amount increases per year. **Original # of Years** is the number of years over which the base is being amortized. **Current Amortization Amount** is the amortization payment amount for this year. **Years Remaining** is the number of years left to amortize the base.

Assumptions and Methodology Summary

The principal actuarial assumptions used in this valuation are the same as the assumptions used in the previous valuation, except where noted, and are summarized in the following table:

Valuation Date	January 1, 2016 Valuation
Interest Rate	7.00% (prior valuation was 7.25%).
Salary Increase	4.00% Ultimate rate; 3.25% base rate while receiving the following steps: • Group 1 and 2: 10 years of 3.0% • Fire: 3 years of 4.7% • Police: 5.2% in year one, followed by 5.6%, 7.3%, 5.0%, and 4.8% in years two through five
COLA	3% of $12,000
COLA Frequency	Granted every year
Mortality	RP-2000 table projected from 2000 with Generational Mortality and Scale BB. For members retired under an Accidental Disability (job-related), 40% of deaths are assumed to be from the same cause as the disability. Disabled mortality RP-2000 table projected from 2000 with Generational Mortality and Scale BB, ages set forward 2 years. (Prior valuation used the same assumption.)
Overall Disability	Groups 1 and 2 45% ordinary disability 55% accidental disability Group 4 10% ordinary disability 90% accidental disability
Retirement Rates (varies depending on date of hire)	Groups 1 and 2 Ages 55 – 70 Group 4 Ages 50 – 65
Administrative Expense	$285,141 budget estimated for FY 2018 provided by Concord Retirement Board.

Assets

	Cash	$	1,163,426.22
	Fixed Income Securities		27,988,260.73
	Pooled Domestic Equity Funds		40,030,307.15
	Pooled International Equity Funds		7,101,500.71
	Pooled Alternative Investments		1,811,599.02
	Pooled Real Estate Funds		6,863,070.58
	PRIT FUND		48,611,393.80
A	Sub-Total:	$	133,569,558.21
	Interest Due and Accrued		195,027.82
	Accounts Receivable		2,177.97
B	Sub-Total:	$	197,205.79
	Market Value of Assets [(A) + (B)]	$	133,766,764.00

- We were furnished with the System's annual report by the Board. The market value of assets as of December 31, 2015 (adjusted for payables and receivables) is $133,766,764.00.

- The asset allocation is approximately 29% fixed income, cash, receivables and payables and 71% equities, alternative investments, hedge funds and similar types of investments. Historically, 10% to 11% has been the expected long-term rate of return for equities, and 6% to 7% has been the expected long-term rate of return for fixed income securities. Many economists and investment professionals are projecting lower gross rates of return, ranging from 6.25% to 9.50% for equities and 3.50% to 8.00% for various asset types such as fixed income securities, real estate, and private debt. In light of these projections, as well as historical investment returns, the 7.00% interest rate assumption is within the reasonable assumption range. We encourage close monitoring for changes in investment performance against expectations.

- Actuarial value of assets (AVA) of $137,855,240 is based on a four-year smoothing method. Investment gains or losses above or below the expected rate of investment return are recognized over 4 years, 25% per year. The AVA must be no more than 110% of the market value of assets and no less than 90% of the market value of assets.

Calculation of Valuation Assets as of January 1, 2016

FOUR-YEAR ASSET SMOOTHING

1. Market value of assets including receivable/payable as of 01/01/2016 — 133,766,764

2. Phase-in of asset gains and losses

	Plan Year (1)	Original Amount (2)	Percent Unrecognized (3)	Amount Unrecognized (2) x (3)
a.	2015	($9,213,689)	75%	($6,910,267)
b.	2014	$1,702,738	50%	$851,369
c.	2013	$7,881,687	25%	$1,970,422
d.	2012	$4,157,975	0%	$0
e.	Total	$4,528,711		($4,088,476)

3. Valuation assets without corridor as of 01/01/2016 (1. - 2.e.) — 137,855,240

4. Corridor Check
   a. 90% of Market Value — 120,390,088
   b. 110% of Market Value — 147,143,440

5. Valuation assets with corridor as of 01/01/2016 (3. within Corridor) — $137,855,240

6. Calculation of return on valuation assets

   a. Valuation assets as of 01/01/2015 — $126,816,839

   b. ER contribs + EE contribs - Ben Pymts - Expenses — $249,305

   c. Actual return on valuation assets 5. - (6.a. + 6.b.) — 10,789,097

   d. Weighted value of valuation assets — 126,941,491

   e. Return on valuation assets (6.c. / 6.d.) — 8.5%

   f. Annualized return on assets — 8.5%

Disclosure Information Under GASB Statement 25

SCHEDULES OF FUNDING PROGRESS
(Dollars In Thousands)

Actuarial Valuation Date	Actuarial Value of Assets A	Actuarial Accrued Liability B	Unfunded AAL (UAAL) B-A	Funded Ratio A/B	Covered Payroll C	UAAL as a % of Covered Payroll (B-A)/C
1/1/2016	$137,855	$167,011	$29,156	83%	$29,941	97%
1/1/2015	$126,817	$156,552	$29,735	81%	$29,283	102%
1/1/2014	$115,340	$142,405	$27,065	81%	$27,514	98%
1/1/2012	$94,996	$123,798	$28,802	77%	$25,221	114%
1/1/2010	$90,445	$106,054	$15,609	85%	$24,097	65%

NOTES TO SCHEDULES

Additional information as of the latest actuarial valuation follows:

Valuation Date	1/1/2016
Actuarial cost method	Entry Age Normal
Amortization method	2.00% amortization increase
Remaining amortization period	13 years for the fresh start base
Asset valuation method	Market value adjusted by accounts payable and receivables adjusted to phase in over 4 years investment gains or losses above or below the expected rate of investment return. The actuarial value of assets must be no less than 90% of the adjusted market value nor more than 110% of the adjusted market value. Market value of assets is $133,766,764.00
<u>Actuarial assumptions:</u>	
Investment Rate of Return	7.00% per year (7.25% in prior valuation)
Projected Salary Increases	4.00% Ultimate rate; 3.50% base rate while receiving the following steps: • Group 1 and 2: 7 years of 4.3% • Fire: 3 years of 4.7% • Police: 5.2% in year one, followed by 5.6%, 7.3%, 5.0%, and 4.8% in years two through five

PERAC Information Disclosure

The most recent actuarial valuation of the System was prepared by Stone Consulting, Inc. as of January 1, 2016

The normal cost for employees on that date was:	$2,726,688	9.1% of payroll
The normal cost for the employer was:	$1,898,648	6.3% of payroll

The actuarial liability for active members was:	$93,599,121
The actuarial liability for retired members was (includes inactives):	$73,412,372
Total actuarial accrued liability:	$167,011,493
System assets as of that date ($133,766,764 Market Value):	$137,855,240
Unfunded actuarial accrued liability:	$29,156,253

The ratio of system's assets to total actuarial liability was:	83%

As of that date the total covered employee payroll was:	$29,941,179

The principal actuarial assumptions used in the valuation are as follows:

Investment Return:	7.00% per annum (7.25% in prior valuation)
Rate of Salary Increase:	Select and ultimate rate (4.00% ultimate rate)

SCHEDULE OF FUNDING PROGRESS (Dollars in $000's)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
1/1/2016	$137,855	$167,011	$29,156	83%	$29,941	97%
1/1/2015	$126,817	$156,552	$29,735	81%	$29,283	102%
1/1/2014	$115,340	$142,405	$27,065	81%	$27,514	98%
1/1/2012	$94,996	$123,798	$28,802	77%	$25,221	114%
1/1/2010	$90,445	$106,054	$15,609	85%	$24,097	65%

Actuarial Methods and Assumptions

ACTUARIAL METHODS

Actuarial Cost Method

The Entry Age Normal Actuarial Cost Method has been used in this valuation. Under this method, the normal cost is the amount calculated as the level percentage of compensation necessary to fully fund the prospective benefits from each member's entry age to retirement age.

The actuarial accrued liability represents the theoretical accumulation of all prior years' normal costs for the plan members as if the program had always been in effect. The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over plan assets.

Asset Valuation Method

Market value of assets (adjusted by payables and receivables) adjusted to phase in investment gains or losses above or below the expected rate of investment return over a four-year rolling period. The first 25% is recognized immediately, with an additional 25% recognized each following year. The actuarial value of assets may be no less than 90%, or more than 110% of the market value of assets plus payables and receivables. See page 14 for detailed information.

Fiscal Year Adjustment

The actuarial results are adjusted by the valuation interest rate and salary scale to the beginning of Fiscal Year 2018. The unfunded actuarial accrued liability is rolled forward with normal cost and further adjusted by anticipated contributions and interest.

ACTUARIAL ASSUMPTIONS

Investment Return

7.00% per year net of investment expenses (7.25% in prior valuation).

Regular Interest Rate Credited to Annuity Savings Account

2% per year.

Salary Increases

4.00% Ultimate rate; 3.25% base rate while receiving the following steps which are added to the base rate:

- Group 1 and 2: 10 years of 3.0%
- Fire: 3 years of 4.7%
- Police: 5.2% in year one, followed by 5.6%, 7.3%, 5.0%, and 4.8% in years two through five

Actuarial Methods and Assumptions
(Continued)

Withdrawal Prior to Retirement

The rates shown at the following sample years of service illustrate the withdrawal assumption. Withdrawal rates for an employee are set to zero if the retirement rate at their age is nonzero. Retirement rates by age are shown on page 19.

Rate of Withdrawal

Service	Group 1 and 2	Group 4
0	15%	1.5%
1	12%	1.5%
2	10%	1.5%
3	9%	1.5%
4	8%	1.5%
5	7.6%	1.5%
10	5.4%	1.5%
15	3.3%	0.0%
20	2.0%	0.0%
25	1.0%	0.0%
30+	0.0%	0.0%

Disability Prior to Retirement

The rates shown at the following sample ages illustrate the assumption regarding the incidence of disability:

Rate of Disability

Age	Group 1 and 2	Group 4
20	0.01%	0.10%
25	0.02%	0.20%
30	0.03%	0.30%
35	0.06%	0.30%
40	0.10%	0.30%
45	0.15%	1.00%
50	0.19%	1.25%
55	0.24%	1.20%
60	0.28%	0.85%

Disability is assumed to be 45% ordinary and 55% accidental for Group 1 and 2 and 10% ordinary and 90% accidental for Group 4.

Actuarial Methods and Assumptions
(Continued)

Rates of Retirement

The rates shown at the following ages illustrate the assumption regarding the incidence of retirement, once the member has achieved 10 years of service:

				Hired after 4/1/2012		
Age	Group 1& 2 Male	Group 1 & 2 Female	Group 4	Group 1& 2 Male	Group 1 & 2 Female	Group 4
50	1%	1.5%	2%	0%	0%	0%
51	1%	1.5%	2%	0%	0%	0%
52	1%	2.0%	2%	0%	0%	0%
53	1%	2.5%	2%	0%	0%	0%
54	2%	2.5%	7.5%	0%	0%	0%
55	2%	5.5%	15%	0%	0%	10%
56	2.5%	6.5%	10%	0%	0%	7%
57	2.5%	6.5%	10%	0%	0%	20%
58	5%	6.5%	10%	0%	0%	10%
59	6.5%	6.5%	15%	0%	0%	15%
60	12%	5%	20%	25%	30%	20%
61	20%	13%	20%	20%	13%	20%
62	30%	15%	25%	30%	15%	25%
63	25%	12.5%	25%	25%	12.5%	25%
64	22%	18%	30%	22%	18%	30%
65	40%	15%	100%	40%	15%	100%
66	25%	20%	N/A	25%	20%	N/A
67	25%	20%	N/A	25%	20%	N/A
68	30%	25%	N/A	30%	25%	N/A
69	30%	20%	N/A	30%	20%	N/A
70	100%	100%	N/A	100%	100%	N/A

Mortality

RP-2000 table projected from 2000 with Generational Mortality and Scale BB (sex-distinct). (Prior valuation used the same assumption). During employment the healthy employee mortality table is used. Post-employment the healthy annuitant table is used. In-service death is assumed to be 55% accidental for group 1 and 2 and 90% accidental for group 4.

Disabled Life Mortality

RP-2000 table projected from 2000 with Generational Mortality and Scale BB for healthy annuitants, set-forward by 2 years (sex-distinct). Death is assumed to be due to the same cause as the disability 40% of the time. (Prior valuation used the same assumption).

Actuarial Methods and Assumptions
(Continued)

Family Composition

Members assumed married with 2 dependent children – one male and one female both age 15; age difference between member and spouse assumed to be 3 years (the male being the older).

Cost-of-Living Increases

A 3% COLA on the first $12,000 of a member's retirement allowance is assumed to be granted every year.

Administrative Expenses

Estimated budgeted amount of $285,141 for the Fiscal Year 2018 excluding investment management fees and custodial fee is added to the Normal Cost.

Net 3(8)(c)

Net 3(8)(c) payments are assumed to be the same level as the past calendar year for all future years.

Step Increases

Step increases are assumed to be part of the salary increase assumption.

Credited Service

All service is assumed to be due to employment with the municipality.

Contribution Timing

Contributions are assumed to be made at the beginning of the fiscal year.

Total Payroll Increase

The total payroll is assumed to increase at 4.25% per year.

Valuation Date

January 1, 2016.

Summary of Principal Provisions

1. PARTICIPANT

Participation is mandatory for all full-time employees whose employment commences before age 65. There are three classes of members in the retirement system:

- Group 1: general employees
- Group 2: employees in specified hazardous occupations (e.g., electricians)
- Group 4: police and firefighters

2. MEMBER CONTRIBUTIONS

Member contributions vary depending upon date hired as follows:

Date of Hire	Member Contribution Rate
Prior to 1975	5% of Pay
1975 – 1983	7% of Pay
1984 – June 30, 1996	8% of Pay
After June 30, 1996	9% of Pay

Members hired after 1978 contribute an additional 2% of pay over $30,000 (annualized on a pay period basis).

3. PAY

a. Pay

Gross regular compensation excluding bonuses, overtime, severance pay, unused sick pay, and other similar compensation. For those hired after 12/31/2010, covered pay is limited to 64% of the IRS Code Section 401(a)(17) pay limit.

b. Average Pay

The average of pay during the three consecutive years that produce the highest average or, if greater, during the last three years (whether or not consecutive) preceding retirement. For members joining the MGL Chapter 32 Retirement System after April 1, 2012, five-year averages will be used.

4. CREDITED SERVICE

Period during which an employee contributes to the retirement system plus certain periods of military service and "purchased" service.

5. SERVICE RETIREMENT

a. Eligibility

1) Attainment of age 55 and completion of ten years of credited service or at any age with completion of 20 years of service. If hired prior to 1978 or a member of Group 4, the completion of ten years of service is not required.

2) System member after April 1, 2012 and Group 1 – Age 60 and Completion of 10 years of credited service. Group 2 – Age 55 and completion of 10 years of service. Group 4 – Age 55.

Summary of Principal Provisions (Continued)

b. Retirement Allowance

Determined as the product of the member's benefit percentage, average pay and credited service, where the benefit percentage is shown below (maximum allowance of 80% of average pay):

Benefit % X Average Pay X Years of Service = Benefit, limited at 80% of average pay

BENEFIT % BASED ON ATTAINED AGE AT RETIREMENT			
Benefit Percentage	Group 1	Group 2	Group 4
2.5%	65+	60+	55+
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	N/A	49
1.8	58	N/A	48
1.7	57	N/A	47
1.6	56	N/A	46
1.5	55	N/A	45
	Hired after April 1, 2012*		
2.5%	67+	62+	57+
2.35	66	61	56
2.20	65	60	55
2.05	64	59	54
1.90	63	58	53
1.75	62	57	52
1.60	61	56	51
1.45	60	55	50

*Reduction is .125% for each year early instead of .15% per year for employees with over 30 years of service.

In addition, veterans receive an additional $15 per year for each year of credited service up to 20 years

6. DEFERRED VESTED RETIREMENT

a. Eligibility

Completion of 10 years of credited service (for elected and appointed members, 6 years in the event of involuntary termination).

b. Retirement Allowance

Determined in the same manner as "Service Retirement" section above with the member eligible to start collecting a benefit at age 55, (or age 57 for post-April 1, 2012 hires) or defer until later at his or her discretion. If a member chooses, his or her contributions with interest may be withdrawn. The amount of interest he or she will receive depends on length of service and whether or not the termination of employment was voluntary.

Summary of Principal Provisions (Continued)

7. ORDINARY DISABILITY RETIREMENT

a. Eligibility

Non-job related disability after completion of 10 years of credited service.

b. Retirement Allowance

Determined in the same manner as "Service Retirement" section and calculated as if the member had attained age 55 (or age 57 for those hired after April 1, 2012), if younger. Veterans receive 50% of pay (during final year) plus an annuity based on accumulated member contributions with interest.

8. ACCIDENTAL DISABILITY RETIREMENT

a. Eligibility

Disabled as a result of an accident in the performance of duties. No age or service requirement.

b. Retirement Allowance

72% of pay plus an annuity based on accumulated member contributions with interest. Also, a dependent's allowance per year for each child. Total allowance not to exceed 100% of pay (75% for members hired after 1987).

9. NON-OCCUPATIONAL DEATH

a. Eligibility

Dies while in active service, but not due to occupational injury. 2 years of service.

b. Retirement Allowance

Benefit as if Option C had been elected (see below) and member had attained age 55 (or age 57 for those hired after April 1, 2012) if younger. Minimum monthly benefits provided as follows: spouse - $500, first child - $120, each additional child - $90

10. OCCUPATIONAL DEATH

a. Eligibility

Dies as a result of an occupational injury.

b. Benefit Amount

72% of pay plus refund of annuity savings fund balance. In the case of an accidental disability retiree who dies of the same cause, the beneficiary receives 72% of the last 12 months salary or the current pension amount, whichever is greater.

Summary of Principal Provisions
(Continued)

11. COST-OF-LIVING INCREASES

An increase of up to 3% applied to the first $12,000 of annual benefit. Fully funded by the Employer from and after Fiscal Year 1999. Percentage increase is voted on each year by the Retirement Board. Cost-of-living increases granted during Fiscal Year 1982 through Fiscal 1998 are reimbursed by the Commonwealth.

12. OPTIONAL FORMS OF PAYMENT

- Option A

Allowance payable monthly for the life of the member.

- Option B

Allowance payable monthly for the life of the member with a guarantee of remaining member contributions with interest.

- Option C

Allowance payable monthly for the life of the member with 66-2/3% continuing to the member's beneficiary upon the member's death. If the beneficiary predeceases the member, the allowance amount "pops up" to the non-reduced amount.

Glossary of Terms

- Actuarial Accrued Liability

  The portion of the Present Value of Benefits that is attributable to past service.

- Actuarial Assets

  Market value of assets (adjusted by payables and receivables) adjusted to phase in investment gains or losses above or below the expected rate of investment return over a four-year rolling period. The first 25% is recognized immediately, with an additional 25% recognized each following year. The actuarial value of assets may be no less than 90%, or more than 110% of the market value of assets plus payables and receivables. See page 14 for detailed information.

- Actuarial Assumptions

Estimates are made as to the occurrence of certain events that determine the level of benefits to be paid and how long they will be provided. The more important actuarial assumptions include the investment return on assets, salary increases and the rates of turnover, disability, retirement and mortality.

- Actuarial Cost Method

The procedure that is used to allocate the present value of benefits between the liability that is attributable to past service (Actuarial Accrued Liability) and that attributable to future service.

- GASB

Government Accounting Standards Board (issues guidance for disclosure of retirement system liabilities).

- Normal Cost

The portion of the Present Value of Benefits that is attributable to benefits to be earned in the coming year.

- PERAC

Public Employee Retirement Administration Commission, a division of the State government which has regulatory authority over the administration of the retirement system.

- Present Value of Benefits

Represents the dollar value today of all benefits expected to be earned by current members if all actuarial assumptions are exactly realized.

- PRIT

Pension Reserves Investment Trust Fund is the state controlled and administered fund for the investment of assets for members of the retirement system.

- Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability not covered by System Assets.

Rollup of Unfunded Actuarial Liability to July 1, 2017

Valuation Date January 1, 2016

	Water	Sewer	Electric Light	Swim & Fitness	All Others	Total
Accrued Liability as of January 1, 2016	$3,788,260	$947,065	$15,583,407	$2,017,440	$144,675,321	$167,011,493
Gross Normal Cost as of January 1, 2016	85,142	21,286	296,867	97,096	4,124,945	4,625,336
Expected Employee Contributions during 2016	76,468	19,117	251,495	65,397	2,314,211	2,726,688
Expected Benefit Payouts excluding COLA during 2016[1]	86,017	21,504	691,552	8,304	6,049,450	6,856,829
Actuarial Value of Assets as of December 31, 2015	$3,126,919	$781,730	$12,862,913	$1,665,243	$119,418,435	$137,855,240
Unfunded Actuarial Accrued Liability as of July 1, 2017	$642,144	$160,536	$2,666,652	$295,310	$26,406,822	$30,171,464
Funding Ratio as of January 1, 2016	83%	83%	83%	83%	83%	83%

[1]State reimbursed COLA

Town of Concord Retirement System

DEPARTMENT BREAKDOWN OF FISCAL 2017 CONTRIBUTION

	Water	Sewer	Electric Light	Swim & Fitness	All Others	Total
1. Amortization	$ 64,781	$ 16,195	$ 269,020	$29,792	$ 2,664,002	$ 3,043,791
2. Net Normal Cost Fiscal 2018 including Administrative Expense[1]	14,482	3,620	66,596	39,727	2,181,679	$ 2,306,105
3. Net 3(8)(c) payments[2]	2,853	713	11,738	1,520	108,973	125,797
4. Fiscal 2018 Appropriation (1+2)	$ 82,117	$ 20,529	$ 347,354	$ 71,038	$ 4,954,654	$ 5,475,692

[1] Net Normal Cost for Fiscal 2018 plus administrative expense which is allocated by gross normal cost

[2] Net 3(8)(c) payments allocated by actuarial accrued liability